CLAIMS

1. A fuel cell manufacturing method for manufacturing a fuel cell by implementing predetermined processing on a polymer electrolyte membrane (1), comprising:

a process of feeding the polymer electrolyte membrane (1), which is wound around a reel (9), formed in strip form, and has conveyance holes (10, 212) formed in series at fixed intervals on both side portions thereof in a lengthwise direction, by rotating a conveyance roller (32, 132, 211) comprising on an outer periphery thereof projections (32A, 320) which engage with the conveyance holes (10, 212); and

a process of performing predetermined processing at a predetermined processing timing which is set on the basis of a rotation speed of the conveyance roller (32, 132).

2. The manufacturing method as defined in Claim 1, wherein the polymer electrolyte membrane (1) comprises a catalyst layer (12) formed in advance on a surface thereof at fixed intervals, and a positioning mark (11) formed in accordance with a formation position of the catalyst layer (12), and the manufacturing method further comprises a process of setting the predetermined processing timing on the basis of the rotation speed of the conveyance roller (32) and the positioning mark (11).

3. The manufacturing method as defined in Claim 2, further comprising:

a process of using a sensor (26) to detect a displacement speed of the conveyance holes (10) and passage of the positioning mark (11) at a predetermined

point through which the polymer electrolyte membrane (1) passes; and

a process of determining the predetermined processing timing on the basis of the displacement speed of the conveyance holes (10) and a detection timing of the positioning mark (11).

4. The manufacturing method as defined in Claim 1, further comprising:

a process of using a sensor (26) to detect a displacement speed of the conveyance holes (10); and

a process of controlling the rotation speed of the conveyance roller (32) such that the displacement speed of the conveyance holes (10) matches a predetermined target displacement speed.

5. The manufacturing method as defined in any one of Claim 2 through Claim 4, wherein the predetermined processing comprises:

a process of adhering a gas diffusion layer (6) to the catalyst layer (12); and

a process of adhering a separator (7) to the gas diffusion layer (6) adhered to the catalyst layer (12).

6. The manufacturing method as defined in Claim 5, wherein the process of adhering the gas diffusion layer (6) to the catalyst layer (12) comprises:

a process of pressing the gas diffusion layer (6), which is coated with a polymer electrolyte liquid, against the catalyst layer (12) to temporarily fix the gas diffusion layer (6) to the catalyst layer (12); and

a process of applying thermal compression to the catalyst layer (12) and the gas diffusion layer (6) to adhere the gas diffusion layer (6) to the catalyst layer

(12).

7. The manufacturing method as defined in Claim 5, wherein the process of adhering the separator (7) to the gas diffusion layer (6) comprises:

a process of coating the separator (7) with a sealing agent;

a process of pressing the separator (7) coated with the sealing agent against the gas diffusion layer (6); and

a process of subjecting the sealing agent to thermal drying with the separator (7) pressed against the gas diffusion layer (6).

8. The manufacturing method as defined in Claim 1, wherein the polymer electrolyte membrane (1) is covered with a protective sheet (8, 8A, 8B) in advance, and the manufacturing method further comprises a process of peeling the protective sheet (8, 8A) away from the polymer electrolyte membrane (1) prior to the predetermined processing.

9. The manufacturing method as defined in Claim 8, wherein the protective sheet (8, 8A, 8B) is constituted by a first sheet (8B) covering the two side portions of the polymer electrolyte membrane (1) excluding the conveyance holes (10), and a second sheet (8A) covering a central portion of the polymer electrolyte membrane (1), and the process of peeling away the protective sheet (8, 8A) comprises a process of peeling away only the second sheet (8A) while the first sheet (8B) is left intact.

10. The manufacturing method as defined in Claim 1, wherein the polymer

electrolyte membrane (1) comprises a catalyst layer (12) formed at fixed intervals in advance, and the predetermined processing further comprises:

a process of feeding two films (95) to which a separator (7) is affixed in advance at identical intervals to the catalyst layer (12), each film (95) being formed in advance with positioning holes (10A) at identical intervals to the conveyance holes (10) in the polymer electrolyte membrane (1), by rotating a pair of second conveyance rollers (132A) comprising on an outer periphery thereof projections which engage with the positioning holes (10A), and fixing the separator (7) to the catalyst layer (12), with the polymer electrolyte membrane (1) sandwiched between the two films (95), using a pair of joining rollers (133), one of the joining rollers (133) comprising projections (320) which penetrate the positioning holes (10) and the conveyance holes (10).

11. A fuel cell manufacturing device for manufacturing a fuel cell by implementing predetermined processing on a polymer electrolyte membrane (1), comprising:

a polymer electrolyte membrane (1) which is wound around a reel (9), formed in strip form, and has conveyance holes (10, 212) formed in series at fixed intervals on both side portions thereof in a lengthwise direction;

a conveyance roller (32, 132, 211) comprising on an outer periphery thereof a projections (32A, 320) which engage with the conveyance holes (10); and

a processing unit (3, 4, 94, 133, 201) which performs predetermined processing on the polymer electrolyte membrane (1), which is fed from the reel (9) by rotating the conveyance roller (32, 132, 211), at a predetermined processing timing set on the basis of a rotation speed of the conveyance roller (32, 132, 211).

12. A polymer electrolyte membrane (1) which is wound around a reel (9) and subjected to predetermined processing to manufacture a fuel cell, the polymer electrolyte membrane (1) comprising conveyance holes (10, 212) formed in series at fixed intervals on both side portions thereof in a lengthwise direction, the conveyance holes (10, 212) engaging with projections (32A, 320) formed on a conveyance roller (32, 132, 211), wherein the polymer electrolyte membrane (1) is fed from the reel (9) as the conveyance roller (32, 132, 211) rotates.

13. The polymer electrolyte membrane (1) as defined in Claim 12, wherein the polymer electrolyte membrane (1) further comprises:

a catalyst layer (12) formed at fixed intervals on a surface thereof; and

a positioning mark (11) that can be read by a sensor (26) which indicates a formation position of the catalyst layer (12).

14. The polymer electrolyte membrane (1) as defined in Claim 12 or Claim 13, wherein the polymer electrolyte membrane (1) is covered with a protective sheet (8, 8A, 8B) which is peeled away prior to the predetermined processing.

15. The polymer electrolyte membrane (1) as defined in Claim 14, wherein the protective sheet (8, 8A, 8B) comprises a first protective sheet (8B) covering the two side portions of the polymer electrolyte membrane (1) excluding the conveyance holes (10), and a second protective sheet (8A) covering a central portion positioned between the two side portions.

16. A manufacturing method for a fuel cell formed by laminating a polymer

electrolyte membrane (1) and a separator (220) alternately, comprising:

a first process of supplying a film-form polymer electrolyte membrane (1) from a side of a first separator (220), which is held in a predetermined position, to a position facing the first separator (220) in parallel with the first separator (220);

a second process of supplying a second separator (220) to an opposite side of the polymer electrolyte membrane (1), which faces the first separator (220), to the first separator (220); and

a third process of displacing the second separator (220) toward the first separator (220) such that the polymer electrolyte membrane (1) is sandwiched between the first separator (220) and the second separator (220) while being cut into a predetermined shape and dimension.

17. The manufacturing method as defined in Claim 16, further comprising a fourth process of applying tension to the polymer electrolyte membrane (1) by pressing the first separator (220) against the polymer electrolyte membrane (1) prior to the displacement of the second separator (220).

18. The manufacturing method as defined in Claim 16, wherein the polymer electrolyte membrane (1) comprises conveyance holes (212) formed in series at fixed intervals on both side portions thereof in a lengthwise direction, and the first process comprises a process of feeding the polymer electrolyte membrane (1) to the position facing the first separator (220) using a conveyance roller (211) comprising on an outer periphery thereof projections (320) which engage with the holes (212).

19. The manufacturing method as defined in any of Claim 16 through Claim 18, wherein a perforation (213) having incisions which define a cutout part is formed in advance on the polymer electrolyte membrane (1) at predetermined intervals, and the third process comprises a process of cutting out the cutout part by pressing the perforation (213) with the second separator (220).

20. The manufacturing method as defined in any of Claim 16 through Claim 18, wherein the third process comprises a process of cutting the polymer electrolyte membrane (1) into the predetermined shape and dimension using a cutter (215) which displaces in an identical direction to the second separator (220).

21. The manufacturing method as defined in any of Claim 16 through Claim 18, further comprising a fourth process of stacking a fuel cell produced in the third process and comprising the first separator (220), the polymer electrolyte membrane (1), and the second separator (220) within a holding frame (218).

22. The manufacturing method as defined in Claim 21, wherein the holding frame (218) is constituted by a guide member (218) which permits displacement of the fuel cell only in an identical direction to the displacement of the second separator (220).

23. A manufacturing device for a fuel cell formed by laminating a polymer electrolyte membrane (1) and a separator (220) alternately, comprising:

a polymer electrolyte membrane conveyance unit (202) which supplies a

film-form polymer electrolyte membrane (1) from a side of a first separator (220), which is held in a predetermined position, to a predetermined position facing the first separator (220) in parallel with the first separator (220);

a separator supply unit (203) which supplies a second separator (220) to an opposite side of the polymer electrolyte membrane (1), positioned in the predetermined position, to the first separator (220); and

a lamination unit (201) which displaces the second separator (220) toward the first separator (220) such that the polymer electrolyte membrane (1) is sandwiched between the first separator (220) and the second separator (220) while being cut into a predetermined shape and dimension.

24. The manufacturing device as defined in Claim 23, wherein the polymer electrolyte membrane (1) comprises conveyance holes (212) formed in series at fixed intervals on both side portions thereof in a lengthwise direction, and the polymer electrolyte membrane conveyance unit (202) comprises a conveyance roller (211) comprising on an outer periphery thereof projections (320) which engage with the holes (212) in order to feed the polymer electrolyte membrane (1) to the predetermined position.

25. The manufacturing device as defined in Claim 24, wherein the lamination unit (201) comprises a member (207) which increases a tension of the polymer electrolyte membrane (1) by pressing the polymer electrolyte membrane (1) in the predetermined position via the first separator (220).

26. The manufacturing device as defined in Claim 24 or Claim 25, wherein a

perforation (213) having incisions which define a cutout part is formed in advance on the polymer electrolyte membrane (1) at predetermined intervals, and the conveyance roller (211) is constituted to convey the polymer electrolyte membrane (1) to the predetermined position in lengths corresponding to the intervals.

27. The manufacturing device as defined in Claim 24 or Claim 25, wherein the lamination unit (201) comprises a cutter (215) which cuts the polymer electrolyte membrane (1) into the predetermined shape and dimension by displacing in an identical direction to the second separator (220).

28. The manufacturing device as defined in Claim 24 or Claim 25, wherein the lamination unit (201) is constituted to displace the second separator (220) toward the first separator (220) through the predetermined position.

29. The manufacturing device as defined in Claim 23, wherein the lamination unit (201) comprises a holding frame (218) in which a fuel cell constituted by the polymer electrolyte membrane (1) sandwiched between the first separator (220) and the second separator (220) is stacked up to a predetermined number.

30. The manufacturing device as defined in Claim 23, wherein the first separator (220) and the second separator (220) comprise a gas diffusion layer (221A, 221B) facing the polymer electrolyte membrane (1).